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SUPPORT DIRECTORATE
FIVE YEAR ADP PLAN
FY 69 - FY 73

SUPPORT INFORMATION PROCESSING SYSTEM

INTRODUCTION

A review of computer applications and interests in the Support Directorate during the summer of 1964 disclosed that there was a great deal of dissatisfaction with existing systems. Reports produced by the computer were not being received when they were wanted, and when they arrived in the hands of the customer, they were already out of date. Computer outputs were being used as base documents to which daily changes and updating were being posted manually. Manual postings were being periodically batched for conversion to machine language as input to the computer to update the computer records and during this process additional changes were occurring with the result that computer outputs were never current. Each system existed as an entity unto itself without any systematized or integrated communication with other related systems.

The review also disclosed that some of the Support components had developed plans to undertake extensive redesign of existing computer systems to overcome problems which had been identified. Meanwhile, the Office of Computer Services was reviewing its hardware capability and pursuing plans to update it by installation of third generation equipment. It became clear that the need to update hardware regardless of the equipment selected would require extensive reprogramming and redesign of all of the applications supporting DD/S requirements.

These and many other similar problems with the existing systems were surfaced and, considered together with the plans of the several components for new systems which seemed destined to create the same sorts of problems in a new environment and the plans of the Office of Computer Services to update its equipment, it was quite apparent that coordination of EDP interests in the Support Directorate was of vital importance. Accordingly, the Deputy Director for Support, in September 1964 decided to proceed immediately with the conduct of a total system study covering all data processed and all information produced to satisfy all of management's requirements in all of the Support functions.

OBJECTIVES and PURPOSE

The objectives for the Support Information Processing Systems can be summarized as follows:

1. To collect and analyze all data in the current system, determine its purpose and evaluate the extent to which it serves that purpose.

2. To identify and analyze significant manual procedures and automate or provide improved manual methods for them.

3. To determine the major data-information flows and what they should be from input to output.

4. To identify those data items which are of general interest in the present system and to further identify those which should be included but which are not currently retreivable to satisfy present and projected requirements.

5. To provide a system of inputting data of general interest at the first information source and for timely updating as changes occur.

6. To identify, analyze, define and evaluate requirements for information generated by all levels of Agency management and to generally design an information and data system which will satisfy those requirements.

7. To determine to what extent an integrated system is desirable and practical and to identify and evaluate sub-systems as they relate to or are independent of the integrated system.

8. To insure that communication among the sub-systems and the integrated system is systematized.

9. To provide the capability for remote data communication between the system and field stations in so far as that may be feasible, practical and will contribute to more effective management.

10. To develop an orderly hierarchy of system implementation plans leading ultimately to the "model system".

11. To provide a system analysis and design competence at the Directorate level and a mechanism to ensure that management improvement methods and techniques, whether manual or automated, evolve in an orderly

progression in the context of Directorate requirements and in accordance with a Directorate plan; and to guard against separate and independent system development by and within the functional components where independence may lead to incompatibility.

12. To provide a continuing systems management and control mechanism for systems maintenance and change.

13. To develop a data processing competence in each office of the Support Directorate.

14. To provide solutions, within reasonable cost and time limitations, for the problems surfaced during the review of Support Directorate data processing systems and requirements.

15. To take maximum advantage of modern technology while at the same time ensuring that systems are automated only when some other alternative is not more reasonable, practical and effective.

OFFICES INVOLVED

The Support Information Processing System encompasses the functions of all of the offices of the Support Directorate as well as the immediate consumers of Support data and information outside the Directorate.

TARGET AREA

As indicated in the Program memorandum assignment of target areas is "not applicable except as the systems being designed may be expected to produce support data and information permitting such analysis to be performed by other components of the Agency."

JUSTIFICATION

The Support Directorate is the focal point for accountability and control of people, money and materiel in support of the total Agency mission. An overall upgrading of the Support ADP capability as well as its significant manual procedures is the most feasible way of insuring continued and improved responsiveness for the Directorate.

PLANNING ASSUMPTIONS

The Support Directorate is faced with rather severe manpower and

budgetary constraints. The demand for services continues to increase in volume and complexity without permitting a corresponding increase in manpower or budgetary ceilings. Increased ceilings, while attractive, offer no real or conclusive solution since appropriately qualified manpower is difficult to acquire and retain.

1. During the period covered by this plan there are limited alternatives available to Support management for effectively dealing with its requirements. Chief among the alternatives, and the only one which holds promise for continued Directorate responsiveness, is the development and implementation of the Support Information Processing System (SIPS).

2. ADP offers the only realistic avenue for attack on the present and future operational and management burdens.

3. Successful development of ADP systems is dependent on close and continuing participation by the operating and senior management levels of the user offices.

4. The long term significance of ADP lies not in hardware but in the broader, overall system which includes data origination, hardcopy, manual processing, man-machine interrelationships, the production of output in whatever form, the purposes to which it is put, the reasons it is produced, and the requirements it satisfies.

5. Effective systems emerge from thorough examination and study of the total operating and management environment.

   We do not imply that "total" refers to the incorporation of an organization into some electronic or electro-mechanical configuration, rather that the total organization is brought into the system context. The Office of Training, for example, is viewed from the dual perspective of a system "user" and as a contributor to system effectiveness via its training mission. This concept of a total system also encompasses the analysis and design of manual systems and the establishment of effective interfaces between manual and automated systems.

6. System Management will be a continuing, distinct requirement for an organization involved in an ADP system design effort.

   Although the System is embedded in the organization it supports, it has at the same time an organizational identity of its own.

System responsibility cannot be distributed across the components of the organization without destroying system integrity. System change and modification must take place in the context of the total system not just that portion of the system a particular user is associated with.

7. System planning, development and implementation is evolutionary rather than revolutionary.

Some of the consequences of this assumption relate directly to assumption number 6 above, others relate to assumption number 5. While a system concept may reflect revolutionary organizational and functional changes, this concept can only be achieved through carefully controlled step by step advance.

8. An additional somewhat more specific assumption has been that the Office of Computer Services will provide in the required quantity at the proper time and with requisite capability the manpower and hardware resources for designing computer systems, writing computer programs and operating the implemented systems.

9. If Computer Services, due to its manpower constraints, cannot meet the demands of Support systems alternative actions will be required.

The Support Directorate with the Office of Computer Services will propose to Agency Management courses of action for acquiring supplementary resources, such as limited contractual assistance and the identification and training of Support careerists.

10. If the hardware configuration currently planned by the Office of Computer Services and the system design and programming support should fail to satisfy the legitimate demands of the Support Systems, the Support Directorate will press for the establishment of a "stand alone" computer capability devoted to Support data and information processing.

PROJECT DESCRIPTION

The system activities related to the Support Information Processing System Study can be considered for the purposes of this Five Year Plan as discrete projects. It must be remembered, however, that these projects exist because the over all system project exists; they are not in any sense functionally distinct. The following paragraphs discuss; (1) the system; (2) file conversion, from manual to automated form; (3) personnel training in ADP system operation; (4) design of new forms and development and writing of new procedures and (5) use of communication devices.

1. System

The foregoing statements of objectives and assumptions give some indication of the nature and scope of the Support Information Processing Study. This study is divided into three related systems corresponding to the Agency's Financial, Human and Materiel Resources and the Task Force has been divided into three teams accordingly. The tasks related to the Support Information Processing System is comprised of four major phases: 1) Collection; 2) Analysis; 3) Design and Coordination; and 4) Implementation. These phases are presented to assist in understanding the program schedule and current project status, and to identify the unique requirements of each major step in the development of an automatic data processing system.

The Task Force has completed the Collection and Analysis phases for each of the three systems. In the course of these Phases, 3,250 paperwork surveys were conducted; 491 flowcharts were constructed; 2,027 documents containing 34,350 data items were collected and coded. As the attached schedule indicates, the three systems are being concurrently developed with provision for appropriate interfaces. Their varying rates of progress are based on the size and complexity of the individual systems and the manpower available to work on each. Nevertheless, all three systems are following the general cycle described below.

The current effort is focused on the design and coordination phase which first involves breaking the broad conceptual models of the systems into smaller, more manageable sub-systems. The benchmarks for this phase are (1) management approval of conceptual models, (2) user subsystem specification, (3) computer system design specifications and finally (4) program specification. With the production of program specifications SIPS will move into its implementation phase with benchmarks as follows: (1) programming, (2) debugging, (3) sub-system test, (4) sub-system implementation.

The user specification for the first sub-system is scheduled for March 1967; the implementation of the final sub-system is projected for June 1970. These dates appear reasonable in terms of the present Information Processing Branch manpower level. However, the validity of the terminal date depends upon the capability of the Office of Computer Services to provide requisite numbers of computer systems analysts and programmers at the right time. Detailed projections have been presented to the Office of Computer Services separately to permit them to incorporate the necessary resources in their planning and programming.

2. File Conversion

The design and implementation of sub-systems of SIPS requires that certain manually-processed files and documents be added to the automated data base. This conversion will be phased in accordance with the attached system implementation schedule.

The projected requirement for personnel to support file conversion begins in FY 1968 with seven conversion clerks and expands to 14 conversion clerks in FY 1969. This requirement is a temporary one, terminating in the first quarter of FY 1970. The conversion clerks will be responsible for the editing of documents before key punching and for the transfer and editing of data from a file document to a document more suitable for key punching. Funds for contracting for the conversion effort have been requested in FY 69 and FY 70.

3. ADP Training

Effective operation of an ADP system depends directly on the continual, thorough exercise of discipline by its users. This discipline is the product of carefully conceived and executed user training at the clerical, middle management and senior management levels. Some of this training should be started late in FY 1968, but the major impact will occur in the period FY 1969 - FY 1973. The initial step in this effort should be the early assignment of a qualified Training Officer to the Information Processing Branch.

4. Forms Design and Procedures Writing

One-time entry and centralized processing, storage and presentation of information in SIPS will permit a major consolidation and simplification of the forms and procedures necessary in current operations. The services of the Records Administration and Regulations Control Branches will be enlisted in the redesign of forms and the development of new procedures. In addition, a requirement is anticipated for the short-term detail to the Information Processing Branch of experts in the procedures of the affected Support Offices. No additional personnel costs are anticipated for these functions, the printing costs are estimated at $2,000 beginning in FY 1969.

5. Communications

Utilization of the Agency's communications capability is a hallmark of SIPS planning. The immediate usefulness of this capability is reflected in

the Materiel and Financial Resources areas where data flows to the Headquarters systems from world wide sources.

Present Office of Communications planning as represented by the installation of automated Message Switching Capability (MAX) and the gradual implementation of an 8 level communications coding structure (permitting message checking) gives strong indication of the reasonableness of utilizing this message communications capability for the transmission of data. The SIPS effort is not expected to extend the communications load beyond its present or projected capacities. The following assumptions are basic to implementation of a remote communications capability.

a) Until the general upgrading of communications capabilities takes place data accuracy (including transmission errors) will be the responsibility of the consumer. The individual preparing a transaction in the field will be required to verify the accuracy of data before transmission and the Headquarter's recipient will recheck the data prior to input into the computer system. As automatic transmission error detection capability becomes available in upgraded communications equipment, we anticipate its use in the remote systems devised for SIPS. This capability will not relieve the data originator of his responsibility for data accuracy, it will however, materially reduce the amount of Headquarter's processing required prior to input to the computer system and thus speed the acquisition of and response to data and information received via communications channels.

b) The Information Processing Branch will at the earliest possible time develop data, data formats and procedures for testing the remote communications concept. We anticipate no long term problem with communicating data, the procedures employed by the field station and those within the Headquarter's system will have to be most carefully drawn.

Testing for remote communications will begin in Fiscal 1968 using Office of Logistics and Office of Finance data. The best location for this testing will be determined by the responsible office, IPB and the Office of Communications.

c) Assuming favorable test results it is anticipated that during the Fiscal 1969 - 1970 time period selected field stations will use remote communications capabilities for transmitting Logistics and Financial transactions to a Headquarter's computer system. The stations, and their precedence has not been determined, these determinations will be made with the Office of Communications and the Clandestine Services.

We further anticipate that during the remainder of this planning period, through Fiscal 1973, this capability will cover all field stations.

METHODOLOGY

The methodology employed for the SIPS effort has been a combination of classical systems analysis techniques plus internally conceived procedures more applicable to the environment.

In order to circumvent the nearly impossible manual task of accounting for all of the collected documents and data items; a document/ data analysis coding form was devised which permits key punching and machine manipulation of the document and/or data interrelationships. The outputs from this application have proved quite useful for studying document content, data sources, data redundancies, incompatibilities and timing. At the same time a method for automated flow charting of current office procedures was devised. This method was not pursued primarily because the manpower effort necessary to prepare the inputs did not appear to balance the unpredictability of success.

Following the collection effort, the task teams organized and analyzed their materials and developed refined systems concepts for management orientation. A secondary but no less important facet of the systems concepts is the structuring of the whole system, permitting identification of major data flow and preliminary identification of required interfaces.

Since conceptual designs are not detailed it is necessary to identify in SIPS terms, the component parts of the system and the functional subsystems, which are now being developed, into User System Specifications. These specifications, a flow chart depicting functional data flow, a narrative description of the flow chart and a statement of performance requirements, serve two purposes. First, for management concurrence, the specifications provide a clear picture of the proposed system. Secondly, they provide a firm communications base for initiating computer systems design with technical personnel from the Office of Computer Services.

The product of the first phase of the computer systems design will be Computer System Specifications, a greater detailing of the flow charts, narratives and performance requirements developed for the User System Specifications. The Computer System Specifications will be "costed out" financially and in terms of manpower savings as well as additional manpower requirements. This set of specifications with cost data and proposed imple-

mentation priorities will be submitted for appropriate approval.

Additionally, the Computer System Specifications provide the basis for developing computer program specifications which, after writing, program testing and system testing, lead to system implementation.

We do not anticipate that the progression described above will proceed uneventfully through its various phases. Slippage of one sort or another is to be expected. We believe that a well planned, carefully controlled, well documented effort will inevitably produce functionally sound ADP systems which permit more effective functional performance, and probably will result in cost reduction. At a minimum we would expect to maintain current cost levels while permitting the assumption and performance of greater work loads.

MANPOWER

The manpower requirement for the SIPS study will be considered in terms of the period leading to system implementation and the post-implementation period.

As stated in our program call, "A task force was formed about 1 January 1965 with the detail of about 5 people from some of the Support Offices to conduct an analysis of support information processing systems. Gradually this Task Force was expanded until at the end of FY 66 it was composed of 21 detailees representing all of the Support Offices. The Executive Director/Comptroller authorized double-slotting by the Support Offices during FY 67 to permit continuation of the program and to absorb work load left behind in the offices by the detailees. A request for continuation of the double-slotting authority for FY 1968 is pending."

Developing and implementing SIPS is a major undertaking, requiring the coordinated efforts of more people than the 21 currently detailed to the Information Processing Branch. Projected branch manpower requirements covering systems analysis and design, forms, procedures, conversion training and system testing total approximately 900 man months. (Appendix I)

We expect to utilize component personnel on a short term basis to assist in forms design, procedures writing, training and conversion.

In addition to this manpower requirement from the Support Offices we have projected and submitted informally to the Office of Computer Services

a requirement for approximately 550 man-months for the Computer System Design, Programming Specification and Programming tasks. (Appendix I)

The quality of the detailees assigned by the Support Offices to the SIPS study reflects the interest and concern of the offices for the success of the study. While their method of staffing the system study is at this time the most practical approach, it cannot be considered more than a temporary expedient. We foresee the time when members of the task teams will return to their respective Offices, hopefully to positions from which they will contribute to the effective use and maintenance of the system within the Office.

As indicated in the fourth assumption for the SIPS study the system needs of the individual offices can only be served in the overall system context. This context cannot be maintained by distributing system responsibilities to the Offices of the Support Directorate.

Present planning indicates that a permanent organization of approximately 15 positions will be required to maintain and extend the SIPS functions. There is little question that these integrated systems will create a different operating environment for the Support Directorate, we are not yet able to forecast the most feasible way of insuring the continued effectiveness of this environment.

A host of problems accompanies the creation of positions, personnel selection, career management, grade and position descriptions etc.; and we will not proceed with staffing until we can provide Support Management a staffing plan which assures both user office and system the best possible support.

The Combined Program Call for the Support Services Staff includes for Fiscal 1969 planning the creation of 15 positions for the Information Processing Branch.

IMPLEMENTATION PLAN

A precisely detailed implementation plan must await the Computer System Specifications, since final implementation will depend on selections from cost-time-method alternatives.

We plan to implement subsystems in sequences based primarily on the best fit between Support Directorate priorities and potential for relief of

current OCS workload. The target dates for subsystem implementation extend well into calendar year 1970. We expect to meet these target dates provided OCS manpower resources are made available or, failing that, other resources are made available. The subsystems included in the current SIPS effort are not all inclusive. Each of the study teams has been forced to be selective.

Materiel Resources will proceed, for example, with Transportation and Real Estate and Construction Subsystems as manpower becomes available. The Materiel team is fully committed to the development of eight functional subsystems; a two phased Procurement system, Cataloging, Requisitioning, Stock Management, Warehousing, Reports and Administration and the Financial interface.

The Finance system includes six functional areas; Authority Control, Other Government Agencies, Monetary Operations, Payroll, General Accounting, and Property. There are again functional areas to be studied and developed as manpower becomes available; Shortages and Overages, Proprietary and Industrial Contract Audit.

The Human Resources study team includes all of the activities involved with the Recruitment, Pre-employment, Entrance on Duty, Employment and Termination functions. Related functional areas such as the Credit Union, and Insurance activities will be phased into SIPS as manpower becomes available.

These implementation plans do not represent positions on the frontiers of data and information processing. While remote query, multiprocessing time-sharing and other hardware/software features hold great promise, they are not regarded as primary objectives for SIPS. Our immediate objectives are the reduction of document and report volumes, simplification of manual and automated procedures, establishment of long term, efficient data structures, development of sound data access methodology and the reduction of overall processing time through remote communications capability when possible, practical and economic.

Reasonable success with these objectives in the FY 69 - 70 time period will provide a firm base for implementing the more sophisticated techniques. One factor of considerable importance for this second implementation era will be developing a management environment for utilization of these techniques.

We see no alternative to development of SIPS, the alternatives that exist are those affecting the way in which SIPS is developed. At present, for example, we plan concurrent subsystem implementation across the three task teams with a degree of sequential implementation within each. The degree to which this plan may be compromised will depend upon the availability of skilled manpower.

Subsystem priorities are basically arbitrary assignments of value which can be changed as required. The basic priority parameters are Support Management requirements and OCS workload relief. The extent to which one supercedes the other must be determined subsystem by subsystem.